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EXAMINER	
LE, THI Q	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/815,033	**Applicant(s)** DORRER ET AL.	
	Examiner Thi Q. Le	**Art Unit** 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1-3, 10-11, 15-17, 24, 27, 29-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Snawerdt (US Patent # 6,476,952)** in view of **Ito (US Patent # 6,650,846)**.

Consider **claim 1**, Snawerdt clearly shows and discloses, a method comprising: modulating the output of an optical source to optically encode electronic data using phase modulation to generate an optical signal (read as, phase modulator 16 is configure to encode incoming data using phase shift; column 5 lines 25-31). Snawerdt fail to disclose, alternating the polarization of the phase shift keyed optical signal using a modulator such that successive optical bits have substantially orthogonal polarizations to generate an alternate polarization Phase modulated signal

In related art, Ito disclose, alternating the polarization of the phase modulated optical signal using a modulator such that successive optical bits have substantially orthogonal polarizations to generate an alternate polarization Phase modulated signal (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

Consider **claims 2 and 3, and as applied to claim 1 above**, Snawerdt as modified Ito disclosed a phase modulator, but fails to disclose a phase modulator is driven by a sinusoidal RF voltage or square pulses.

The examiner take office notice that it is well known in the art at the time of the invention that either sinusoidal RF voltage or square pulse can be use to drive a typical phase modulator. Since, different applications have different requirements, thus, using sinusoidal RF voltage or square pulses to drive a phase modulator provides different fills the different requirements of a particular application.

Consider **claim 10**, Snawerdt clearly shows and discloses, a method comprising: precoding an electronic data signal (read as, circuitry shown in figure two provides precoding of electrical data; figure 2, column 5 lines 41-55); modulating the output of an optical source using the precoded electronic data signal and phase shift keying between two optical bits separated by an even number of bit periods to generate an encoded optical signal (read as, phase modulator 16 is configure to phase shift the data output from control circuit 18, which has a two bit delay applied to it by circuit shown in figure 2; figures 1 and 2, column 5 lines 24-32, column 7 lines 34-40). Snawerdt fails to disclose, differential phase shift keying and alternating the polarization of the phase shift keyed optical signal using a modulator such that successive optical bits have

substantially orthogonal polarizations to generate an alternate polarization Phase modulated signal.

The examiner takes office notice that at the time of the invention it is well known that a phase modulator can be modified to perform differential phase shift keying. Since DPSK enable higher bit rate transmission over longer transmission distances.

In related art, Ito disclose, alternating the polarization of the phase modulated optical signal using a modulator such that successive optical bits have substantially orthogonal polarizations to generate an alternate polarization Phase modulated signal (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

Consider **claim 11**, and **as applied to claim 10 above**, Snawerdt as modified by Ito further disclosed, demodulating the APol-DPSK signal using an even bit delay line interferometer (Snawerdt disclosed, the interferometer 40 is a two bit delay interferometer; figure 1, column 7 lines 34-60).

Consider **claim 15**, Snawerdt clearly shows and discloses, an optical transmitter for APol-PSK transmission comprising: an optical source (read as, laser 12; figure 1); an optical phase-shift-keying data modulator optically coupled to the optical source (read as, phase

modulator 16; figure 1). Snawerdt fails to disclose, a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator.

In related art, Ito disclose, a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

Consider **claims 16 and 17, and as applied to claim 15 above**, Snawerdt as modified Ito disclosed a phase modulator, but fails to disclose a phase modulator is driven by a sinusoidal RF voltage or square pulses.

The examiner take office notice that it is well known in the art at the time of the invention that either sinusoidal RF voltage or square pulse can be use to drive a typical phase modulator. Since, different applications have different requirements, thus, using sinusoidal RF voltage or square pulses to drive a phase modulator provides different fills the different requirements of a particular application. Also, Ito disclosed a polarization modulator that is driven a train of square pulses 102, that running at half the bit rate (figure 15).

Consider **claim 24**, Snawerdt clearly shows and discloses, an optical transmitter for APoI-DPSK transmission comprising:

an optical source (read as, laser 12; figure 1);

a precoder device for precoding an electronic data signal (read as, delay circuitry shown in figure 2; column 5 lines 41-55);

an optical phase-shift-keying data modulator optically coupled to the laser source and driven by a precoded electronic data signal from the precoder device to produce an optical PSK signal wherein electronic data to be transmitted is optically encoded by the data modulator as phase shift keying between two optical bits separated by an even number of bit periods (read as, phase modulator 16 is configure to phase shift the data output from control circuit 18, which has a two bit delay applied to it by circuit shown in figure 2; figures 1 and 2, column 5 lines 24-32, column 7 lines 34-40). Snawerdt fails to disclose, differential phase shift keying and a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator.

The examiner takes office notice that at the time of the invention it is well known that a phase modulator can be modified to perform differential phase shift keying. Since DPSK enable higher bit rate transmission over longer transmission distances.

In related art, Ito disclose, a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization

alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

Consider **claim 27**, Snawerdt clearly shows and discloses, an optical transmitter for APol-DPSK transmission comprising:

an optical source (read as, laser 12; figure 1);

an optical phase-shift-keying data modulator optically coupled to the optical source (read as, phase modulator 16 is connected to laser 12; figure 1). Snawerdt fails to disclose, a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator.

In related art, Ito disclose, a polarization alternator optically coupled to the data modulator to provide polarization alternation of the output of the data modulator (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

Consider **claim 29**, is rejected for similar reason as claim 24 above.

Consider **claim 30**, Snawerdt clearly shows and discloses, an apparatus for generating an APol-PSK optical signal comprising:

means for encoding electronic data using phase shift keying (PSK) to generate an optical signal (read as, phase modulator 16 is configure to phase shift the data output from control circuit 18; figure 1, figures 1 and 2, column 5 lines 24-32, column 7 lines 34-40). Snawerdt fails to disclose, modulator means for alternating the polarization of the optical signal to generate an alternate polarization PSK (APol-PSK) signal.

In related art, Ito disclose, modulator means for alternating the polarization of the optical signal to generate an alternate polarization PSK (APol-PSK) signal (read as, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

6. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Snawerdt (US Patent # 6,476,952)** in view of **Ito (US Patent # 6,650,846)** and further in view of **Fujiwara et al. (US PGPub 2003/0161638)**.

Consider **claim 4**, and **as applied to claim 1 above**, Snawerdt as modified by Ito disclosed the invention as described above, except for, wherein the optical signal is launched into the modulator having a polarization oriented at a predetermined angle such that the polarization of successive optical bits of the output signal are substantially orthogonal.

In related art, Fujiwara et al. disclose, wherein the optical signal is launched into the modulator (read as, polarization scrambler; figure 22A) having a polarization oriented at a

predetermined angle (read as, the polarization entering the polarization scrambler is oriented at 45 degrees) such that the polarization of successive optical bits of the output signal are substantially orthogonal (figure 22A; paragraphs 0194, 0198).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Fujiwara et al. with Snawerdt as modified by Ito. Since, Fujiwara et al. disclose a device with can perform polarization alternation of optical signal with less components; thus, reducing the overall cost of the transmission system.

7. **Claims 5-9, 12-14, 18-23, 25-26, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Snawerdt (US Patent # 6,476,952)** in view of **Ito (US Patent # 6,650,846)** and further in view of **Yao (US Patent# 5,654,818)**.

Consider **claim 5**, and **as applied to claim 1 above**, Snawerdt as modified by Ito disclose the invention as described above; except for, wherein the modulator is a Mach-Zehnder modulator including a polarization rotation device in at least one arm.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt as modified by Ito. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable “integrated optic” devices.

Consider **claim 6**, and **as applied to claim 1 above**, Snawerdt as modified by Ito and further modified by Yao disclose the invention as described above, except for, wherein the polarization rotation device is a half-wave plate. The Examiner takes official notice that it is well known in the art that a half-wave plate is use for polarization rotation of 90 degrees. Since Ito as modified by Yao disclose a polarization rotator 52, Yao-figure 4, which is use for rotation the polarization of the input optical signal by 90 degrees; it would have been obvious for a person of ordinary skill in the art to know that the polarization device 52 can be a half-wave plate. Since using a half-wave plate for polarization rotation is simple and requires little components; thus, reducing the cost of the system.

Consider **claims 7 and 8, and as applied to claim 5 above**, Snawerdt as modified by Ito disclosed a phase modulator, but fails to disclose a phase modulator is driven by a sinusoidal RF voltage or square pulses.

The examiner take office notice that it is well known in the art at the time of the invention that either sinusoidal RF voltage or square pulse can be use to drive a typical phase modulator. Since, different applications have different requirements, thus, using sinusoidal RF voltage or square pulses to drive a phase modulator provides different fills the different requirements of a particular application. Also, Ito disclosed a polarization modulator that is driven a train of square pulses 102, that running at half the bit rate (figure 15).

Consider **claim 9**, Snawerdt clearly shows and discloses, A method of APoI-PSK transmission comprising: using an electronic data signal to drive a Mach-Zehnder modulator to provide optical data encoding by phase shift keying (read as, phase modulator 16 is configure to encode incoming data using phase shift; column 5 lines 25-31). Snawerdt fail to disclose, a

Mach-Zehnder modulator having a polarization rotation device in at least one arm and providing simultaneous polarization alternation.

In related art, Ito disclose, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt as modified by Ito. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable "integrated optic" devices. (note, Yao disclosed having phase modulator and polarization rotation within the arms of the interferometer; thus simultaneous polarization alternation and phase shift modulation can be accomplished).

Consider **claim 12**, Snawerdt clearly shows and discloses, a method of APol-PSK transmission comprising: precoding an electronic data signal (read as, circuitry shown in figure two provides precoding of electrical data; figure 2, column 5 lines 41-55); using the precoded

electronic data signal to drive a Mach-Zehnder modulator to provide optical data encoding by phase shift keying between two optical bits separated by an even number of bit periods (read as, phase modulator 16 (i.e. a Mach Zehnder phase modulator, column 5 lines 17-18) is configure to phase shift the data output from control circuit 18, which has a two bit delay applied to it by circuit shown in figure 2; figures 1 and 2, column 5 lines 24-32, column 7 lines 34-40). Snawerdt fails to disclose, a Mach-Zehnder modulator having a polarization rotation device in at least one arm and providing simultaneous polarization alternation.

In related art, Ito disclose, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt as modified by Ito. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable "integrated optic" devices. (note, Yao disclosed having phase modulator and polarization rotation within the arms

of the interferometer; thus simultaneous polarization alternation and phase shift modulation can be accomplished).

Consider **claim 13**, and **as applied to claim 12 above**, claim 13 is rejected for the same reason as claim 6 above.

Consider **claim 14**, and **as applied to claim 12 above**, Snawerdt as modified by Ito and further modified by Yao, further disclosed, demodulating the APol-DPSK signal using an even bit delay line interferometer (Snawerdt disclosed, the interferometer 40 is a two bit delay interferometer; figure 1, column 7 lines 34-60).

Consider **claim 18**, and **as applied to claim 12 above**, Snawerdt as modified by Ito and further modified by Yao, further disclosed, wherein the polarization alternator is a modified Mach-Zehnder modulator (Yao disclosed, Mach-Zehnder modulator of figure 4) having a polarization rotation device in one arm (Yao disclosed, polarization rotator 52; figure 4; column 5 lines 19-26).

Consider **claims 19, 20, and as applied to claim 18 above**, Snawerdt as modified by Ito disclosed a phase modulator, but fails to disclose a phase modulator is driven by a sinusoidal RF voltage or square pulses.

The examiner take office notice that it is well known in the art at the time of the invention that either sinusoidal RF voltage or square pulse can be use to drive a typical phase modulator. Since, different applications have different requirements, thus, using sinusoidal RF voltage or square pulses to drive a phase modulator provides different fills the different requirements of a particular application. Also, Ito disclosed a polarization modulator that is driven a train of square pulses 102, that running at half the bit rate (figure 15).

Consider **claim 21**, and **as applied to claim 15 above**, Snawerdt as modified by Ito and further modified by Yao, further disclosed, a Mach-Zehnder modulator (Yao discloses, Mach-Zehnder modulator of figure 3) having two complementary output ports (Yao discloses, output ports 26 and 28; figure 3), and wherein the apparatus further comprises a polarization beam combiner (Yao discloses, polarization beam combiner 12'; figure 3) for combining outputs from the two output ports of the Mach-Zehnder modulator (Yao, figure 3; column 6 lines 1-18).

Consider **claims 22 and 23, and as applied to claim 21 above**, Snawerdt as modified by Ito disclosed a phase modulator, but fails to disclose a phase modulator is driven by a sinusoidal RF voltage or square pulses.

The examiner take office notice that it is well known in the art at the time of the invention that either sinusoidal RF voltage or square pulse can be use to drive a typical phase modulator. Since, different applications have different requirements, thus, using sinusoidal RF voltage or square pulses to drive a phase modulator provides different fills the different requirements of a particular application. Also, Ito disclosed a polarization modulator that is driven a train of square pulses 102, that running at half the bit rate (figure 15).

Consider **claim 25**, Snawerdt clearly shows and discloses, an optical transmitter for APoI-PSK transmission comprising:

an optical source (read as, laser 12; figure 1);

a Mach-Zehnder (MZ) modulator device optically coupled to the laser source (read as, phase modulator 16 (e.g. mach Zehnder phase modulator) is connected to laser 12; figure 1, column 5 lines 17-20); and

drive circuitry coupled to the MZ modulator device to drive a MZ modulator to provides optical data encoding of an optical signal using phase shift keying (read as, controller 18 provides the driving signal to phase modulator 16, which is configured to provide phase shift optical signal; figure 1, column 5 lines 5-31). Snawerdt fail to disclose, a Mach-Zehnder modulator having a polarization rotation device in at least one arm and providing simultaneous polarization alternation.

In related art, Ito disclose, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable "integrated optic" devices. (note, Yao disclosed having phase modulator and polarization rotation within the arms of the interferometer; thus simultaneous polarization alternation and phase shift modulation can be accomplished).

Consider **claim 26**, Snawerdt clearly shows and discloses, an optical transmitter for APol-PSK transmission comprising:

an optical source (read as, laser 12; figure 1);

a precoder (read as, circuitry shown in figure two provides precoding of electrical data; figure 2, column 5 lines 41-55);

a Mach-Zehnder (MZ) modulator device optically coupled to the laser source (read as, phase modulator 16 (e.g. mach Zehnder phase modulator) is connected to laser 12; figure 1, column 5 lines 17-20); and

drive circuitry coupled to the MZ modulator device to drive a MZ modulator using a precoded data signal from the precoder to and optical data encoding of an optical signal using phase shift keying (read as, controller 18 provides the driving signal to phase modulator 16, which is configured to provide phase shift optical signal; figure 1, column 5 lines 5-31). Snawerdt fail to disclose, a Mach-Zehnder modulator having a half-wave plate in one arm and providing simultaneous polarization alternation.

In related art, Ito disclose, using the polarization modulator 4, figure 13, to modulated the output from unit 3; such that, adjacent bits are mutually orthogonal in term of polarization; figure 13) (figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

The Examiner takes official notice that it is well known in the art that a half-wave plate is use for polarization rotation of 90 degrees. Since Ito as modified by Yao disclose a polarization rotator 52, Yao-figure 4, which is use for rotation the polarization of the input optical signal by 90 degrees; it would have been obvious for a person of ordinary skill in the art to know that the polarization device 52 can be a half-wave plate. Since using a half-wave plate for polarization rotation is simple and requires little components; thus, reducing the cost of the system.

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable "integrated optic" devices. (note, Yao disclosed having phase modulator and polarization rotation within the arms of the interferometer; thus simultaneous polarization alternation and phase shift modulation can be accomplished).

Consider **claim 28**, Snawerdt clearly shows and discloses, an optical transmitter for APoI-PSK transmission comprising:

an optical source (read as, laser 12; figure 1); and

a modulator means for providing optical data encoding by phase shift keying (read as, phase modulator 16 is configure to phase shift the data output from control circuit 18; figures 1 and 2, column 5 lines 24-32, column 7 lines 34-40). Snawerdt fails to disclose, a modulator means having a polarization rotation device to provide simultaneous polarization alternation and optical data encoding by phase shift keying to generate an APoI-PSK signal.

In related art, Ito disclose, a modulator means having a polarization rotation device (read as, the polarization modulator 4, figure 13; column 10 lines 19-35).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Ito with Snawerdt. Since applying polarization alternation to the bits help reduce interference between adjacent bits when transmitting optical signal over long distances.

In related art, Yao discloses, a Mach-Zehnder modulator (read as, Mach-Zehnder modulator of figure 4) including a polarization rotation device (read as, polarization rotator 52; figure 4) in at least one arm (figure 4; column 5 lines 19-26).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to incorporate the teachings of Yao with Snawerdt. Since many components of the Mach-Zehnder modulator can be produce by integrated fabrication techniques, which allow for production of small, inexpensive, highly reliable “integrated optic” devices. (note, Yao disclosed

having phase modulator and polarization rotation within the arms of the interferometer; thus simultaneous polarization alternation and phase shift modulation can be accomplished).

Response to Arguments

8. Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any response to this Office Action should be **faxed to** (571) 273-8300 **or mailed to**:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-delivered responses should be brought to

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

10. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Thi Le whose telephone number is (571) 270-1104. The Examiner can normally be reached on Monday-Friday from 7:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

Thi Le

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER